Accel. Precalculus Name_____

Double Angle Identity Practice

Date_____ Period____

Verify each identity.

1) $\dfrac{\sin 4x \cdot (1 - \cos 2x)}{\cos 4x} = 2\sin^2 x \tan 4x$

2) $\dfrac{2\sin x \cos x}{\cos 2x} = \tan 2x$

3) $\csc^2 x - 2\cos^2 x = \cot^2 x - \cos 2x$

4) $2\cos^2 x + \tan^2 x = \sec^2 x + \cos 2x$

5) $2\sin x \cos x \cot x = \dfrac{\sin 2x}{\tan x}$

6) $2\sin x \cos^2 x = \dfrac{1 + \cos 2x}{\csc x}$

7) $\dfrac{\sin^2 x + \cos 2x}{\sin^2 x} = \dfrac{\cot x}{\tan x}$

8) $\dfrac{\tan^2 x}{2\sin^2 x} = \dfrac{1}{1 + \cos 2x}$

9) $\dfrac{1}{1 - \tan^2 x} = \dfrac{\cos^2 x}{\cos 2x}$

10) $\dfrac{\sin 2x}{\sin^2 x} = \dfrac{2}{\tan x}$

11) $-2\sin x \cos x \tan x = \cos 2x - 1$

12) $\dfrac{\sec x}{1 - \cos 2x} = \dfrac{\csc x}{\sin 2x}$

Answers to Double Angle Identity Practice

1) $\dfrac{\sin 4x \cdot (1 - \cos 2x)}{\cos 4x}$ Use $\cos 2x = 1 - 2\sin^2 x$

$\dfrac{2\sin 4x \sin^2 x}{\cos 4x}$ Use $\tan 4x = \dfrac{\sin 4x}{\cos 4x}$

$2\sin^2 x \tan 4x$ ■

2) $\dfrac{2\sin x \cos x}{\cos 2x}$ Use $\sin 2x = 2\sin x \cos x$

$\dfrac{\sin 2x}{\cos 2x}$ Use $\tan 2x = \dfrac{\sin 2x}{\cos 2x}$

$\tan 2x$ ■

3) $\csc^2 x - 2\cos^2 x$ Use $\cot^2 x + 1 = \csc^2 x$

$\cot^2 x + 1 - 2\cos^2 x$ Use $\cos 2x = 2\cos^2 x - 1$

$\cot^2 x - \cos 2x$ ■

4) $2\cos^2 x + \tan^2 x$ Use $\cos 2x = 2\cos^2 x - 1$

$\tan^2 x + 1 + \cos 2x$ Use $\tan^2 x + 1 = \sec^2 x$

$\sec^2 x + \cos 2x$ ■

5) $2\sin x \cos x \cot x$ Use $\sin 2x = 2\sin x \cos x$

$\cot x \sin 2x$ Use $\cot x = \dfrac{1}{\tan x}$

$\dfrac{\sin 2x}{\tan x}$ ■

6) $2\sin x \cos^2 x$ Use $\cos 2x = 2\cos^2 x - 1$

$\sin x \cdot (1 + \cos 2x)$ Use $\csc x = \dfrac{1}{\sin x}$

$\dfrac{1 + \cos 2x}{\csc x}$ ■

7) $\dfrac{\sin^2 x + \cos 2x}{\sin^2 x}$ Use $\cos 2x = \cos^2 x - \sin^2 x$

$\dfrac{\cos^2 x}{\sin^2 x}$ Use $\cot x = \dfrac{\cos x}{\sin x}$

$\cot^2 x$ Use $\cot x = \dfrac{1}{\tan x}$

$\dfrac{\cot x}{\tan x}$ ■

8) $\dfrac{\tan^2 x}{2\sin^2 x}$ Decompose into sine and cosine

$\dfrac{\left(\dfrac{\sin x}{\cos x}\right)^2}{2\sin^2 x}$ Simplify

$\dfrac{1}{2\cos^2 x}$ Use $\cos 2x = 2\cos^2 x - 1$

$\dfrac{1}{1 + \cos 2x}$ ■

9) $\dfrac{1}{1 - \tan^2 x}$ Decompose into sine and cosine

$\dfrac{1}{1 - \left(\dfrac{\sin x}{\cos x}\right)^2}$ Simplify

$\dfrac{\cos^2 x}{\cos^2 x - \sin^2 x}$ Use $\cos 2x = \cos^2 x - \sin^2 x$

$\dfrac{\cos^2 x}{\cos 2x}$ ■

10) $\dfrac{\sin 2x}{\sin^2 x}$ Use $\sin 2x = 2\sin x \cos x$

$\dfrac{2\sin x \cos x}{\sin^2 x}$ Cancel common factors

$\dfrac{2\cos x}{\sin x}$ Use $\tan x = \dfrac{\sin x}{\cos x}$

$\dfrac{2}{\tan x}$ ■

11) $-2\sin x\cos x\tan x$ Use $\tan x = \frac{\sin x}{\cos x}$

$-\frac{2\sin^2 x\cos x}{\cos x}$ Cancel common factors

$-2\sin^2 x$ Use $\cos 2x = 1 - 2\sin^2 x$

$\cos 2x - 1$ ■

12) $\frac{\sec x}{1 - \cos 2x}$ Use $\cos 2x = 1 - 2\sin^2 x$

$\frac{\sec x}{2\sin^2 x}$ Use $\sec x = \frac{1}{\cos x}$

$\frac{1}{2\cos x\sin^2 x}$ Use $\sin 2x = 2\sin x\cos x$

$\frac{1}{\sin 2x\sin x}$ Use $\csc x = \frac{1}{\sin x}$

$\frac{\csc x}{\sin 2x}$ ■

